

WHAT IS CLAIMED IS:

1. A vehicle speed control system comprising:

position detecting means for detecting a position of a vehicle;

5 map information storing means for storing map information containing node information;

pass target node detecting means for detecting one or more pass target nodes over which the vehicle is going to pass, on the basis of the position of the vehicle and the map information;

10 stable running speed calculating means for calculating a stable running speed at which the vehicle runs safely when the vehicle passes over each of the pass target nodes;

vehicle speed detecting means for detecting a current speed of the vehicle;

15 decelerating means for decelerating the vehicle;

control means for controlling the decelerating means;

deceleration calculating means for calculating, on the basis of the position of the vehicle, the pass target nodes, the stable running speed at each of the pass target nodes and the current speed of the vehicle, a deceleration at which the vehicle is decelerated by the control means so that the speed of the vehicle is reduced from the current speed to the stable running speed at the pass target node; and

20

deceleration target point setting means for selecting a node providing a highest deceleration from the pass target nodes on the basis of the deceleration calculated by the deceleration calculating means, setting a maximum deceleration node to a

25

primary deceleration target point when first deceleration control is carried out after the selection of the maximum deceleration node, selecting from the pass target nodes a deceleration end node which is far away from the maximum deceleration node and at which variation of the stable running speed is inverted from reduction to increase, and setting the deceleration end node to a secondary deceleration target point when second deceleration control is carried out after the selection of the maximum deceleration node.

2. The vehicle speed control system according to claim 1, wherein control means controls the decelerating means so that the speed of the vehicle is controlled to the stable running speed at the maximum deceleration node by the time when the vehicle arrives at the primary deceleration target point, and controls the decelerating means so that the speed of the vehicle is controlled to the stable running speed at the deceleration end node by the time when the vehicle arrives at the secondary deceleration target point when the primary deceleration target point and the secondary deceleration target point are different from each other.

3. The vehicle speed control system according to claim 1, wherein the control means starts the deceleration control if the deceleration at the maximum deceleration attains a predetermined value.

4. The vehicle speed control system according to claim 1,  
wherein the deceleration target point setting means resets  
the primary deceleration target point at a preceding side to  
the maximum deceleration node.

5

5. The vehicle speed control system according to claim 1,  
wherein the deceleration target point setting means resets  
the secondary deceleration target point at a preceding side to  
the deceleration end node.

10

6. The vehicle speed control system according to claim 1,  
wherein the deceleration target point setting means resets,  
when the vehicle is being accelerated, the primary deceleration  
target point and the secondary deceleration target point at a  
preceding side by the amount corresponding to a running distance  
which is increased due to the acceleration as compared with a  
case where the vehicle runs at a constant speed.

15

7. The vehicle speed control system according to claim 1  
further comprising:

20

accelerating means for accelerating the vehicle,

wherein the control means stops the deceleration control  
when the speed of the vehicle reaches a stable running speed  
at the maximum deceleration node at a position preceding to the  
primary deceleration target point, and controls the accelerating  
means to carry out acceleration control on the vehicle when the  
speed of the vehicle is lower than the stable running speed at

25

the maximum deceleration node at a position preceding to the primary deceleration target point.

8. The vehicle speed control system according to claim 1 further comprising:

accelerating means for accelerating the vehicle,

wherein the control means stops the deceleration control when the speed of the vehicle reaches a stable running speed at the deceleration end node between the primary deceleration target point and an acceleration starting point at which the vehicle starts to accelerate, and controls the accelerating means to carry out acceleration control on the vehicle when the speed of the vehicle is lower than the stable running speed at the deceleration end node between the primary deceleration target point and the acceleration starting point.

9. The vehicle speed control system according to claim 1, wherein at least one of the value of the stable running speed at the primary deceleration target point and the value of the stable running speed at the secondary deceleration target point is variable by a driver.

10. A program for making a computer function as the deceleration calculating means, the deceleration target point setting means, the control means and the stable running speed calculating means of the vehicle speed control system according to claim 1.

11. A vehicle speed control system for a vehicle comprising:  
position detecting means for detecting a position of a  
vehicle;

5 map information storing means for storing map information  
containing node information and segment information;

pass target node detecting means for detecting, on the  
basis of the position of the vehicle and the map information,  
one or more pass target nodes over which the vehicle is going  
10 to pass;

reference node angle calculating means for calculating  
a reference node angle corresponding to an intersecting angle  
between a preceding segment extension line segment and a  
reference segment on the basis of the map information when a  
15 preceding segment is defined as a segment which has as an end  
point a reference node out of the pass target nodes detected  
by the pass target node detecting means and exists at a preceding  
side to the reference node, the preceding segment extension line  
segment is defined as a segment achieved by extending the  
20 preceding segment in the direction to the opposite side with  
respect to the reference node, and the reference segment is  
defined as a segment located at an opposite side to the preceding  
segment with respect to the reference node;

reference node angle calculating means for correcting,  
25 the reference node angle in the reference node, on the basis  
of a length of the preceding-segment and a length of the reference  
segment on the basis of the map information;

distance calculating means for calculating, on the basis of the map information, an inter-point distance between one of both the end points of the reference segment which is different from the reference node and one of both the end points of the reference segment which is different from the reference node when the reference segment is rotated toward the preceding-segment extension line segment around the reference node by a corrected reference node angle corrected by the reference node angle correcting means; and

stable running speed calculating means for calculating a stable running speed at which the vehicle runs safely when the vehicle passes over the reference node, on the basis of the corrected reference node angle corrected by the reference node angle correcting means and the inter-point distance calculated by the distance calculating means.

12. The vehicle speed control system according to claim 11, wherein the reference node angle correcting means corrects the reference node angle by dividing the length of the reference segment by a sum of the length of the preceding segment and the length of the reference segment and then multiplying a division result by a value of the reference node angle.

13. The vehicle speed control system according to claim 11 further comprising:

stable running speed correcting means for selecting nodes existing before and after a specific node of the nodes when plural

nodes exist, averaging the values of the stable running speed at the selected nodes and the value of the stable running speed at the specific node, and resetting the average value to the stable running speed at the specific node.

5

14. The vehicle speed control system according to claim 11 further comprising:

stable running speed correcting means for selecting comparison nodes existing before and after a specific node of the nodes when plural nodes exist, averaging the values of the stable running speed at the comparison nodes without containing the value of the stable running speed at the specific node when the value of the stable running speed at the specific node is unnatural as compared with the values of the stable running speed at the comparison nodes, and resetting the average value to the stable running speed at the specific node.

15

15. A vehicle speed control system according to claim 11 further comprising:

20

accelerating means for accelerating the vehicle;

decelerating means for decelerating the vehicle;

control means for controlling the accelerating means and the decelerating means, and controlling the speed of the vehicle so that the speed of the vehicle becomes the stable running speed calculated by the vehicle speed control system.

25

16. A program for making a computer function as the pass target

node detecting means, the reference node angle calculating means,  
the reference node angle correcting means, the distance  
calculating means, the stable running speed calculating means  
and the stable running speed correcting means of the vehicle  
5 speed control system according to claim 11.